AP Plants I Practice Test

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

1. Which of the following was not a challenge for survival of the first land plants?
   a. sources of water
   b. sperm transfer
   c. desiccation
   d. animal predation
   e. absorbing enough light

2. Which part of a plant absorbs most of the water and minerals taken up from the soil?
   a. taproots
   b. root hairs
   c. the thick parts of the roots near the base of the stem
   d. storage roots
   e. sections of the root that have secondary xylem

Use the answers below to answer the following questions. Each answer may be used once, more than once, or not at all.

A. parenchyma
B. collenchyma
C. sclerenchyma
D. tracheids
E. sieve cells

3. long, thin tapered cells with lignified cell walls that function in support and permit water to flow through pits
   a. A
   b. B
   c. C
   d. D
   e. E

4. One important difference between the anatomy of roots and the anatomy of leaves is that
   a. only leaves have phloem and only roots have xylem.
   b. the cells of roots have cell walls and leaf cells do not.
   c. a waxy cuticle covers leaves but is absent in roots.
   d. vascular tissue is found in roots but is absent from leaves.
   e. leaves have epidermal tissue but roots do not.

5. Which of the following illustrates the idea that the fate of a cell is a direct result of its position?
   a. Some root epidermal cells form hairs; others do not.
   b. Floating leaves of Cabomba have a different shape than submerged leaves.
   c. Some shoot epidermal cells form stomata; others do not.
   d. A and C only
   e. A, B, and C

6. Compared to a cell with few aquaporins in its membrane, a cell containing many aquaporins will
   a. have a faster rate of osmosis.
   b. have a lower water potential.
   c. have a higher water potential.
d. have a faster rate of active transport.
e. be flaccid.

7. Which of the following statements is false about bulk flow?
   a. It is driven primarily by pressure potential.
   b. It is more effective than diffusion over distances greater than 100 µm.
   c. It depends on a difference in pressure potential at the source and sink.
   d. It depends on the force of gravity on a column of water.
   e. It may be the result of either positive or negative pressure potential.

8. Pine seedlings grown in sterile potting soil grow much slower than seedlings grown in soil from the area where the seeds were collected. This is most likely because
   a. the sterilization process kills the root hairs as they emerge from the seedling.
   b. the normal symbiotic fungi are not present in the sterilized soil.
   c. sterilization removes essential nutrients from the soil.
   d. water and mineral uptake is faster when mycorrhizae are present.
   e. both B and D

9. The soil solution is usually very dilute. After fertilizing a lawn, the concentration of salts in the soil builds up. What would be a response of grass roots to this increase?
   a. Water absorption would increase because of the higher solute potential in the soil.
   b. K⁺ will be actively transported into the root cells.
   c. Root cells will immediately dehydrate and die.
   d. Nutrient salts will diffuse into the root faster.
   e. There will be no noticeable effect.

10. Water potential is generally most negative in which of the following parts of a plant?
    a. mesophyll cells of the leaf
    b. xylem vessels in leaves
    c. xylem vessels in roots
    d. cells of the root cortex
    e. root hairs

11. Transpiration in plants requires all of the following except
    a. adhesion of water molecules to cellulose.
    b. cohesion between water molecules.
    c. evaporation of water molecules.
    d. active transport through xylem cells.
    e. transport through tracheids.

12. Active transport would be least important in the normal functioning of which of the following plant tissue types?
    a. leaf transfer cells
    b. stem xylem
    c. root endodermis
    d. leaf mesophyll
    e. root phloem

13. Water rises in plants primarily by the cohesion-tension model. Which of the following is not true about this model?
    a. Water loss (transpiration) is the driving force for water movement.
    b. The "tension" of this model represents the excitability of the xylem cells.
    c. Cohesion represents the tendency for water molecules to stick together by hydrogen bonds.
    d. The physical forces in the capillary-sized xylem cells make it easier to overcome gravity.
    e. The water potential of the air is more negative than the xylem.
14. Assume that a particular chemical interferes with the establishment and maintenance of proton gradients across the membranes of plant cells. All of the following processes would be directly affected by this chemical except
a. photosynthesis.
b. phloem loading.
c. xylem transport.
d. cellular respiration.
e. stomatal opening.

15. Ignoring all other factors, what kind of day would result in the fastest delivery of water and minerals to the leaves of a tree?
   a. cool, dry day
   b. warm, dry day
   c. warm, humid day
   d. cool, humid day
   e. very hot, dry, windy day

16. If the guard cells and surrounding epidermal cells in a plant are deficient in potassium ions, all of the following would occur except
   a. photosynthesis would decrease.
b. roots would take up less water.
c. phloem transport rates would decrease.
d. leaf temperatures would decrease.
e. stomata would be closed.

17. The opening of stomata is thought to involve
   a. an increase in the osmotic concentration of the guard cells.
b. a decrease in the osmotic concentration of the stoma.
c. active transport of water out of the guard cells.
d. decreased turgor pressure in guard cells.
e. movement of K\(^+\) from guard cells.

18. All of the following are adaptations that help reduce water loss from a plant except
   a. transpiration.
b. sunken stomata.
c. C\(_4\) photosynthesis.
d. small, thick leaves.
e. crassulacean acid metabolism.

19. As a biologist, it is your job to look for plants that have evolved structures with a selective advantage in dry, hot conditions. Which of the following adaptations would be least likely to meet your objective?
   a. CAM plants that grow rapidly
   b. small, thick leaves with stomata on the lower surface
   c. a thick cuticle on fleshy leaves
   d. large, fleshy stems with the ability to carry out photosynthesis
   e. plants that do not produce abscisic acid and have a short, thick tap root
MULTIPLE CHOICE

1. ANS: D  PTS:  1  TOP:  Concept 29.2
2. ANS: B  PTS:  1  TOP:  Concept 35.1
3. ANS: D  PTS:  1  TOP:  Concept 35.1
4. ANS: C  PTS:  1  TOP:  Concept 35.1
5. ANS: E  PTS:  1  TOP:  Concept 35.3
6. ANS: A  PTS:  1  TOP:  Concept 36.1
7. ANS: D  PTS:  1  TOP:  Concept 36.1
8. ANS: E  PTS:  1  TOP:  Concept 36.2
9. ANS: B  PTS:  1  TOP:  Concept 36.2
10. ANS: A  PTS:  1  TOP:  Concept 36.3
11. ANS: D  PTS:  1  TOP:  Concept 36.3
12. ANS: B  PTS:  1  TOP:  Concept 36.3
13. ANS: B  PTS:  1  TOP:  Concept 36.3
14. ANS: C  PTS:  1  TOP:  Concept 36.3
15. ANS: B  PTS:  1  TOP:  Concept 36.4
16. ANS: D  PTS:  1  TOP:  Concept 36.4
17. ANS: A  PTS:  1  TOP:  Concept 36.4
18. ANS: A  PTS:  1  TOP:  Concept 36.4
19. ANS: E  PTS:  1  TOP:  Concept 36.4